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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/646,378	08/22/2003	Barbara F. Smith	4250.2.24	9974

35068 7590 04/06/2006  
UNIVERSITY OF CALIFORNIA  
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EXAMINER

PEZZUTO, HELEN LEE

ART UNIT	PAPER NUMBER
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1713

DATE MAILED: 04/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/646,378	<b>Applicant(s)</b> SMITH ET AL.	
	<b>Examiner</b> Helen L. Pezzuto	<b>Art Unit</b> 1713	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 January 2006.  
 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-43 is/are pending in the application.  
     4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 1-43 is/are rejected.  
 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
 8) ☒ Claim(s) 1-43 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \* c) ☐ None of:  
         1. ☐ Certified copies of the priority documents have been received.  
         2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

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**DETAILED ACTION**

***Response to Amendment***

Applicant's amendment to claims 1, 11-12, 16-18, 24-26, 31-34, 36, 40-43 filed in the response on 1/17/06 is acknowledged. Currently, claims 1-43 are pending in this application.

***Claim Rejections - 35 USC § 112***

1. Claims 24-25, and 42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The recited arsenic, antimony along with the various metallic species in claim 25 is inconsistent with the ordinary meaning of "non-metallic" species. Please clarify in the claims.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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3. Claims 1-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith et al. (US-456 or US-478 or US-956) further in view of GB 2 360 525 (with respect to claims 3-8, 27-30, and 37) or GB 2 360 525 A.

US 5,643,456 or US 5,766,478 or US 5,891,956 to Smith et al. discloses functionalized water-soluble polymers with utility in metal ion binding/recovery in aqueous systems. Prior art disclose and exemplify a variety of polymer backbones, which are modified with various functionalities as presently claimed. Suitable water-soluble polymers include polyethyleneimine (i.e. polyvinylamine) modified with carboxylic acid, ester, amide phosphonic acid, thiol, crown ether, etc. functional groups (see US-478, col. 10, line 41 to col. 11, line 61; working examples). Prior art references further detailed the specification of particles size in relation to ultra filtration membrane utility(col. 11, line 62 to col. 12, line 55). The presently claimed molecular weight ranges is within prior art polymer (col. 16, line 66 to col. 17, line 29).

GB-525 discloses an amino-functional polymer having molecular weight from 150 to 2,000,000, inclusive of polyvinylamines, polyacrylamides, and polyethyleneimines (page 4, line 11 to page 5, line 14). Specifically,

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polyethyleneimine modified with ethylene oxide structures including glycidol is taught (page 5, lines 9-11), which clearly fall within the scope of the instant diol. Crosslinking agents are also disclosed. Furthermore, additives such as glycidol, ethylene glycol and polols are taught to be suitably included, which can conceivably reacts with the polymer backbone to form modified polymers, due to the presence/availability of various reactive moieties (page 9, lines 5-12; page 21, Example 8). Accordingly, it would have been obvious to one skilled in the art to select the suitable amino-functional backbone polymer which contains diol functional groups as taught, motivated by the reasonable expectation of success. Regarding the instant intended use for binding a solute or suite of solutes dissolved in a solution, the examiner takes the position that it is an inherent property of prior art polymer because identical backbone and functional groups are expressively taught.

The smith references do not expressively exemplify diol species expressed in the present claims, but do, however, disclose and exemplify catechol-functionalized PEI, which generically falls within the scope of the instant diol, absent criticality shown for the instant diol

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species as compared to prior art catechol species. In any event, GB-525 discussed above, expressively disclose modified polyethyleneimines which have been functionalized with glycidol. In light of the close structural similarity of the diol species, one skilled in the art would envisaged using glycidol-modified PEI taught in GB-525 for the catechol-modified PEI in Smith et al., motivated by the reasonable expectation of similar property obtained therefrom. Absent evidence of the contrary.

4. Claims 1-2, 9-26, 31-36, and 38-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Howland et al. (US-267).

US 5,726,267 to Howland et al. discloses method of using water-soluble polymer having pendant derivatized amide, ester or ether moieties as binders for ceramic materials (col. 6, line 44 to col. 16, line 59; working examples). Prior art polymer backbones and pendant moieties fall within the scope of the present claims. Suitable ceramic materials include silicon containing species and other which are within the scope of the instant non-metallic species. Accordingly, it would have been obvious to one skilled in the art to formulate the modified water-soluble polymer as taught and subsequently using them to

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bind to ceramic (i.e. non-metallics), motivated by the reasonable expectation of success. Thus, rendering obvious the present claims.

5. Claims 1-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura et al. (Ind. Eng. Chem. Res. 1993, 32, 386-391).

The article to Kawamura et al. discloses method of using polyaminated chitosan resin as potential separators in wastewater treatment application. The hydroxyl moieties on the polysaccharide chitosan are within the scope of the instant diol. As(III), B(III), and Si(IV) are selective ion species, within the scope of the instant non-metallic species, are among those bindable to PEI-CH-D (page 388, Table II). Thus, one having ordinary skill in the art would have readily envisaged using the prior art polymers for binding solute species as taught, motivated by the reasonable expectation of success.

#### ***Response to Arguments***

Applicant's arguments filed 1/17/06, with respect to the Smith and GB references have been fully considered but they are not persuasive. The recited functional language "bindable to a non-metallic solute or a suite of non-metallic solutes" in the amended independent claims do not afforded the effect of a

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distinguishing limitation because applicant has not present evidence showing prior art polymers are not bindable to non-metallic species as well as metallic species. Since the claimed polymers are within the scope of prior art polymers (i.e. same backbone and pendant species), there is sufficient reasons to believe that prior art polymers are capable of being bindable to non-metallic species, absent evidence of the contrary.

Obviousness does not require absolute predictability.

Furthermore, the instant claims are not limited only to binding to non-metallic solutes as asserted, but are directed to binding to both metallic and non-metallic solutes as expressed in the present claims. Finally, it has been held that to overcome a reasonable case of prima facie obviousness, a given claim must be commensurate in scope of with any showing of unexpected results. A limited showing of criticality is insufficient to support a broadly claimed embodiments. Applicant's examples 5-10 are limited to binding of boric acid, silicic acid and arsenous acid using PEI-tartrate, PEI-diol, PEIM, and PEI-SH polymers. The instant claims are much broader than the showing of record. Thus, the examiner's position is maintained.

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is



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reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

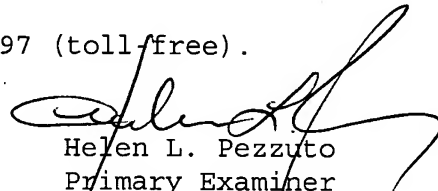
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helen L. Pezzuto whose telephone number is (571) 272-1108. The examiner can normally be reached on 8 AM to 4 PM, Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on (571) 272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).



Helen L. Pezzuto  
Primary Examiner  
Art Unit 1713

hlp